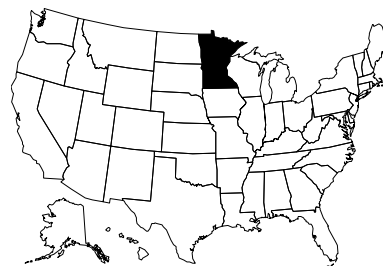# MINNESOTA

Contact Information

Scott Niemela, Research Scientist
Minnesota Pollution Control Agency (MPCA)
520 Lafayette Road ■ St. Paul, MN 55155
Phone 651/296-8878 ■ Fax 651/297-8324
email: scott.niemela@pca.state.mn.us
MPCA Water homepage: http://www.pca.state.mn.us/water/index.html

Program Description

The Minnesota Pollution Control Agency (MPCA) Biological Assessment Unit, located in the Environmental Standards and Analysis Section, performs many functions integral to water quality decision-making. Among these, the Unit:

•   Develops biological measures of ecological integrity for streams and wetlands.
•   Collects and analyzes biological monitoring data.
•   Builds a biological monitoring system that includes streams in the 10 major river basins.
•   Lays the groundwork for the development of biological indicators for lakes and large rivers.
•   Determines biological impairments of rivers and streams for use in TMDL studies
•   Coordinates creation of TMDL listing.

Documentation and Further Information

2000 Minnesota Water Quality: Surface Water Section, Years 1998 - 1999 305(b) Report:
http://www.pca.state.mn.us/publications/reports/305bfinalreport-2000.pdf

Stream Assessment Methods for Use Support: http://www.pca.state.mn.us/water/basins/method98.pdf

MPCA Water Quality Criteria - Aquatic Life Use Support in Rivers and Streams:
http://www.pca.state.mn.us/water/basins/rivkey98.pdf

Minnesota Lake Water Quality Assessment Data: 2000: http://www.pca.state.mn.us/water/pubs/lwqar.pdf

MPCA Environmental Outcomes Division website: http://www.pca.state.mn.us/about/eod.html

MINNESOTA

Contact Information

Scott Niemela, Research Scientist
Minnesota Pollution Control Agency (MPCA)
520 Lafayette Road ■ St. Paul, MN 55155
Phone 651/296-8878 ■ Fax 651/297-8324
email: scott.niemela@pca.state.mn.us
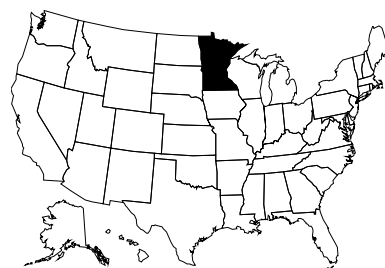
Programmatic Elements

Uses of bioassessment within overall water quality program	✓	problem identification (screening)
	✓	nonpoint source assessments
		monitoring the effectiveness of BMPs
	✓	ALU determinations/ambient monitoring
	✓	promulgated into state water quality standards as biocriteria
		support of antidegradation
	✓	evaluation of discharge permit conditions
	✓	TMDL assessment and monitoring
		other:

Applicable monitoring designs	✓	targeted (i.e., sites selected for specific purpose) *(in specific river basins or watersheds for biocriteria development, problem investigation, and effectiveness monitoring)*
		fixed station (i.e., water quality monitoring stations)
		probabilistic by stream order/catchment area
		probabilistic by ecoregion, or statewide
	✓	rotating basin *(in specific river basins or watersheds for condition monitoring and biocriteria development)*
	✓	other: probabilistic by major basin

Stream Miles

Total miles *(determined using National Hydrography Database)*	**91,944**
Total perennial miles	32,985
Total miles assessed for biology*	2,047
fully supporting for 305(b)	1,575
partially/non-supporting for 305(b)	472
listed for 303(d)	785
number of sites sampled *(on an annual basis)*	100
number of miles assessed per site	depends on segment length

2,047 Miles Assessed for Biology

- 1,575 miles
- 472 miles

▨ "fully supporting" for 305(b)
☐ "partially/non-supporting" for 305(b)
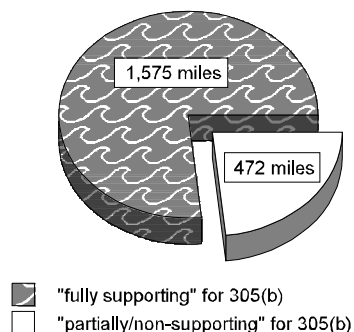
*The discrepancy between 305(b) and 303(d) miles is due to a change in methods related to the threshold level of impairment. The numbers for 303(d) reflect the information from the latest proposed 303(d) list using the new threshold levels. The 305(b) miles will reflect the old threshold levels until the next 305(b) assessments occur.

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	Class System (1,2,3), Fishery Based Uses and Warm Water vs. Cold Water
ALU designations in state water quality standards	Aquatic life and recreation, Class 2. 4 subclasses: 2A, cold water (salmonid) fishery; 2B cool & warm water fishery; 2C, "indigenous" fishery; 2D, wetlands
Narrative Biocriteria in WQS	Numeric procedures to implement narrative biocriteria are in separate Guidance documents, not part of the water quality standards.
Numeric Biocriteria in WQS	none
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)	✓ assessment of aquatic resources ☐ cause and effect determinations ✓ permitted discharges ✓ monitoring (e.g., improvements after mitigation) ✓ watershed based management
Uses of bioassessment/ biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	Bioassessment information is being used in the TMDL process and to support decisions regarding permitted discharges.

Reference Site/Condition Development

Number of reference sites	**35 total**
Reference site determinations*	☐ site-specific ☐ paired watersheds ✓ regional (aggregate of sites) ✓ professional judgment ☐ other:
Reference site criteria	Reference sites are defined as minimally disturbed reaches/areas within a specific geographic region, within a given aquatic classification framework. The criteria used to define reference sites are based on biology, landuse, and habitat and are adjusted by region (basin, ecoregion, etc).
Characterization of reference sites within a regional context	☐ historical conditions ✓ least disturbed sites ☐ gradient response ☐ professional judgment ✓ other:**
Stream stratification within regional reference conditions	✓ ecoregions (or some aggregate) ☐ elevation ✓ stream type ☐ multivariate grouping ☐ jurisdictional (i.e., statewide) ✓ other: At this time MPCA is using major river basin as a framework. This could change once a statewide database is developed.
Additional information	☐ reference sites linked to ALU ☐ reference sites/condition referenced in water quality standards ✓ some reference sites represent acceptable human-induced conditions

*Candidate reference sites are initially selected using GIS coverages including landuse, point source, ditching, and feedlot. After the biological sampling has occurred, reference sites are chosen using the biological, habitat, and GIS based information.

**There are regions within Minnesota where *minimally impacted* reference sites will eventually be identified. MPCA has not had the opportunity to develop biological criteria for these areas yet, but is planning to do so within the next five to ten years.

Field and Lab Methods

Assemblages assessed	✓	benthos *(100-500 samples/year; single season, multiple sites - watershed level)*
	✓	fish *(100-500 samples/year; single season, multiple sites - watershed level)*
		periphyton
	✓	other: macrophytes *(<100 samples/year; single season multiple sites – not at watershed level)*

Benthos	
sampling gear	D-frame; 500-600 micron mesh
habitat selection	multihabitat
subsample size	300 count
taxonomy	genus

Fish	
sampling gear	backpack and boat electrofishers, and pram unit (tote barge)
habitat selection	multihabitat
sample processing	length measurement, biomass - batch and anomalies
subsample	none
taxonomy	species

Habitat assessments	quantitative measurements; performed with bioassessments
Quality assurance program elements	standard operating procedures, periodic meetings and training for biologists, sorting and taxonomic proficiency checks, specimen archival

Data Analysis and Interpretation

Data analysis tools and methods	✓	summary tables, illustrative graphs
		parametric ANOVAs
		multivariate analysis
	✓	biological metrics *(aggregate metrics into an index)*
	✓	disturbance gradients
		other:

Multimetric thresholds	
transforming metrics into unitless scores	95th percentile of all sites
defining impairment in a multimetric index	The percentile of the reference population will vary by major basin because of wide variability between basins regarding the level of human disturbance.

Evaluation of performance characteristics	✓	repeat sampling *(10% of all sites are repeated during a season)*
	✓	precision *(A multiyear study, currently 5 years long, is being conducted to evaluate the precision of IBI scores over a long term period. This work is taking place at reference sites and degraded sites - ten sites total.)*
	✓	sensitivity *(sensitivity has been examined by evaluating IBI scores against gradients of disturbance)*
		bias
	✓	accuracy *(accuracy has been informally examined by comparison of IBI scores to expected results from a landuse/habitat rating score)*

Biological data	
Storage	database (details not provided)
Retrieval and analysis	Systat